Environmental Aspects of Military Compounds, Base Camps:

“The Environment, Sustainability Link”

Overseas Environmental Workshop

25-27 July 06

AGENDA

- Introduction / Context
- Sustainability, Key Concept Enlarged
- Current Operations
- Sustainable System Requirements
- Challenges
- Conclusion
- The Way Ahead

Sustainability Definition

JP 1-02 *- See Military Capability*

military capability — The ability to achieve a specified **wartime** objective (win a war or battle, destroy a target set). It includes four major components: force structure, modernization, readiness, and sustainability.

d. **sustainability** — The ability to maintain the necessary level and duration of operational activity to achieve military objectives. Sustainability is a function of providing for and maintaining those levels of ready forces, materiel, and consumables necessary to support military effort.

Army Strategy for the Environment – *"paraphrased"*

S**ustainability** — The ability to simultaneously meet current as well as future mission requirements worldwide, safeguard human health, improve quality of life, and enhance the natural environment.

Doctrine Drivers:

1. Quadrennial Defense Review, two **imperatives:**
   1. Quadrennial Defense Review,
   2. National Defense Strategy,
   3. National Military Strategy

- **Reorient capabilities and forces to be more agile, to prepare for wider asymmetric challenges, and to hedge against uncertainty over the next 20 years.**

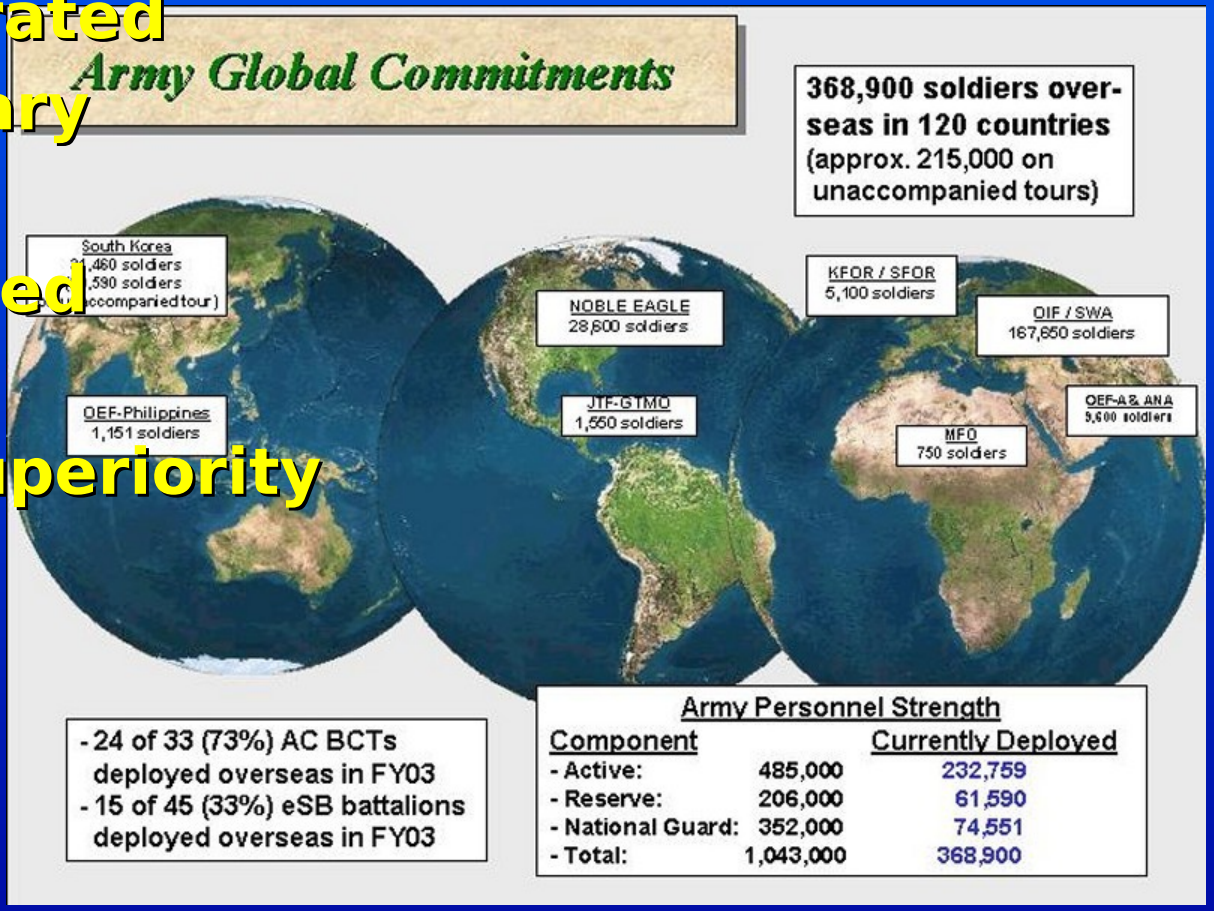
- **Implementing enterprise-wide changes to ensure that organizational structures, processes and procedures effectively support its strategic direction.**

2. National Defense Strategy - Key Capabilities:

- protect critical bases of operation.
- operate in and from the commons by overcoming challenges to our global maritime, air, space, and cyberspace operations.
- project and sustain our forces in distant anti-access environments.
- deny our enemies sanctuary by conducting effective military activities and operations in and from austere geographic locations and at varying operational depths.
- conduct network-centric operations with compatible information and communications systems, usable data, and flexible operational constructs.
- help international and domestic partners increase their capabilities

3. National Military Strategy - Attributes of the Desired Force :

- Fully Integrated
- Expeditionary
- Networked
- Decentralized
- Adaptable
- Decision Superiority
- Lethality



Sustainability Is Not

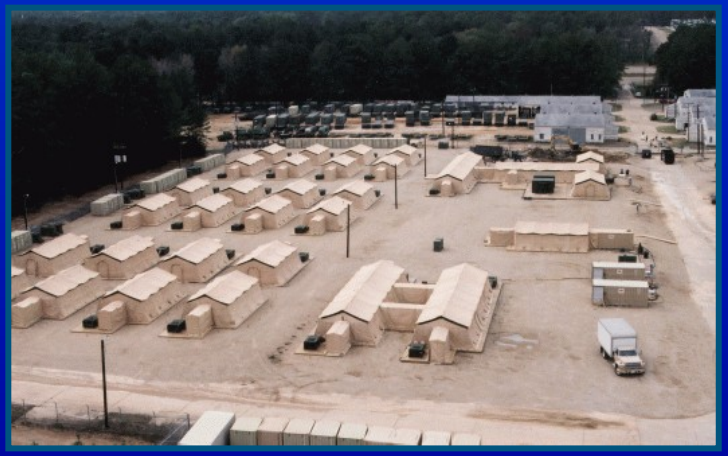
- **Just an Army Issue**
- **Just about Military Forces**
- **Sustainment**
- **Compliance Mandated**
- **Something for DPWs**
- **Just about Installations / Base Camps**
- **Another Environmental Thing**
- **“A Bad Thing”**
- **A Quick Fix**
- **A Done then Over Operations**

CURRENT **OPERATIONS**

- Austere Locations/Urban Environme
- Asymmetrical Operations
- Force Protection as a Priority
- Forward Positioned for Rapid Respor
- "Three Block War",
  Stability and Recovery/Reconstructio
  Concurrent with Combat Operations
- High Degree of Public visibility
- Long Lines of Supply from Consolidated Major Supply Points
- Contractor Support Critical to Maintain Operational Capabilities
- No force on force engagements
- Areas of Concentrated Force
- US Military Better Equipped
- Insurgents Use Hit and Run/Hide, Engage Civilian Targets

CURRENT **OPERATIONS**

- Base Camps
- Life Support Areas
- Advanced Operations Base,
- Forward Operations Base
- Etc.

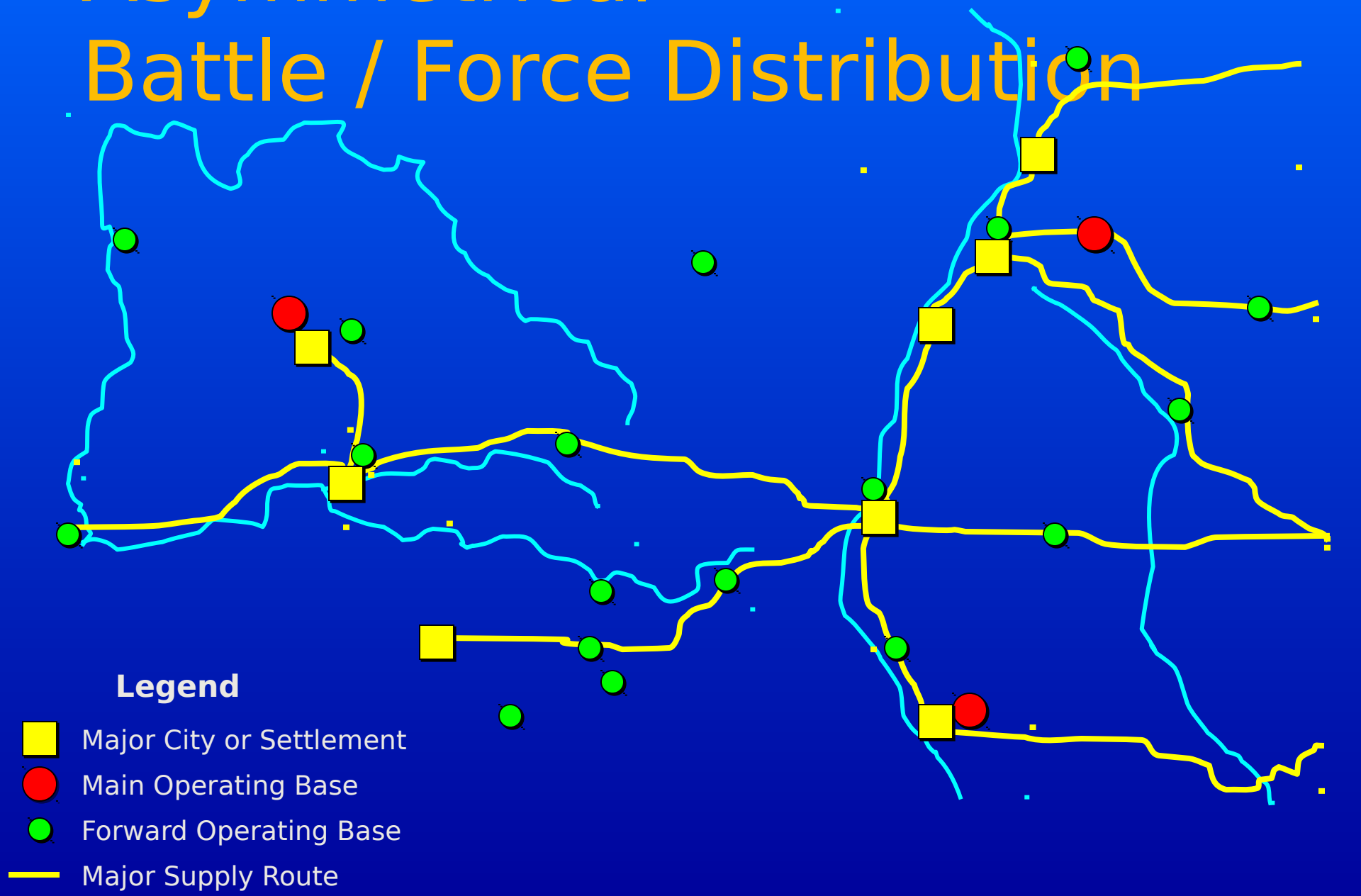


CURRENT **OPERATIONS**

- Supply Lines

- Major Supply points

Asymmetrical Battle / Force Distribution

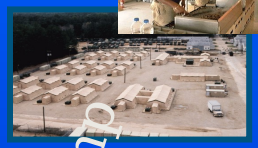


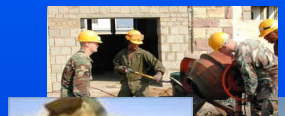
The Southwestern Defense System

Sustainable System Requirements

- Improved Deployability
- Reduced Resource Requirements/Better Systems Management
- Modular/Scalable
- Reusable/Durable/Reliable
- Enhanced

Deployable/Portable





Health & Safety

SW Management

HW Management

Force Protection

Operations

Base Camp

Construction Capabilities

Power Generat

Waste Water

Potable Water

Improve Deployability

Time

- Develop designs for self-assembly
- Improve transportability and maintenance
- Develop robust connections (joints) to enable element deployments

Mass/Volume

- Advance material selection available to designers
  - High strength-to-weight
  - Convertible to energy
  - Highly insulating
  - Improved ballistic resist.
- Define appropriate deployment morphology

Imagine

Pull a string, system emerges. "Plastic" ISO containers,

Reusable/Durable/Reliable

- Easy to Use
- Multi-Year, Multi-Deployment and Redeployment Capability
- Reverse Engineered to Utilize Existing Components as Much as Possible
- Common Parts Across Systems
- Easy to Repair/Replace Components
- Compatible with Other Systems (Sister Services, NATO, Coalition

Reusable/Durable/Reliable

Interchangeable Components

- “Parts is Parts”
- Good Idea is a Good Idea
- Backward and Forward Engineered
- Leverage All Sources, “Beg…Borrow…or Steal”
- Expedited DOTMLPF solutions, ESPECIALLY “M”

Interdependent Systems

- Everything is “Purple”
- One Inventory for Systems
- Interconnectivity
- Joint Systems Engineering
- Joint DOTMLPF

Imagi

Ne Stovepipes, Concept to Employment in Real Time

Base Camps all look and

Modular/ Scalable

- Packaged in Standard Sized Sets
- Plug & Play, Interdependent with Other Services
- Easily Expandable, Upgradeable
- Expansion capabilities
- Modular Pa

Needs to Increase Modularity

Adaptive Capacity

- Enhance Ability to Handle Surges
- Improve Scalability and Ability to Expand or Contract (Physically or Capability)
- Increase Number of Feasible Configurations with Reduced Number of Components

Plug & Play

- Improve Connectability
- Develop Standard Interface “plug”
- Develop Adaptor/ Translation Modules
- Easy to Assemble
- Easy to Use

Imagine

Sleep 5, but pull string, then sleep 15

Genset/shower airdropped in with new visitors

Needs to Enhance Survivability

Force protection

- Deploy enhanced ballistic materials
- Improve deception systems
  - Minimize environmental signature
- Integrate LSA-dual use A/C-habitat-CBRNE protect
- Develop improved sensor systems

Information Mgmt (C^4SI)

- Create base camp command and control capability
- Networked modules
- Facility mgt via modules with self-provided status/ situational awareness
- Increased bandwidth
- Improved network infrastructure

Imagine

Deploy a cloaking system (Harry Potter's cloak)

Habitat tells central comput "people have left for day, cu

Reduce Resource Requirements

Energy management

- Every module can run on multiple/alternative power sources
- Develop fuel cells for elect/ water/heat generation
- Self-sufficient modules
- Higher Efficiencies, Quieter Operations (Generators)

Waste management

- Develop Water Re-use and Cascading Capability to Optimize Water Use
- Develop Re-usable, Re-configurable, Designer Packaging
- Automate Waste Handling
- Improve Waste “Disposal”
- Waste to Energy

Imagi

Ge

Genset “in” showers make electricity, heat, water

Recycled Water, Captured Waste Heat

Reduce Resource Requirements

- **Force Protection Issues**
  - **Intelligence - Waste Indicates Unit Size, Type, and Missi**
  - **Physical Security – Contractor Access and Terrorist Thre**
  - **Health and Safety – DNBI**

- **Costly Set-up: Manpower, Time & Materials**
  - **Lower Priority**
  - **Requires Special Equipment**
  - **Requires Trained Personnel**

- **Sustainment: Resources, Transportation & Dis**
  - **Water: 9 - 109 gallons/day/person**
  - **Diesel Fuel (Generators): 1 - 5 gallons/day/person**
  - **Wastewater: 1.5 - 44 gallons/day/person**
  - **Trash: 0.04 - 0.16 cm/day/person**

Challenges

- Joint Operations Ownership Critical
- Lack of Leadership Training on Sustainability
- Lack of Technical Training Programs for Sustainable Practices
- Trained Personnel - Soldiers and Civilians
- Command does not Place Adequate Emphasis and Mission Focus on Sustainable Operations
- Dedicated Specialties
- Continuity of Command
- Material Availability
- Waste Management
- Reutilization of Resources
- Stand-off in Urban Areas is Minimal
- Size of the Areas to be Protected
- Materie
- Cost

Challenges for Commanders

- **Re-Supply**
- **Environmental concerns with existing locations/facilities**
- **Expedient Temporary Compounds & Conventional Structures Not Designed for Force Protection**
- **Standard Design and Fabrication of Camp Components a <u>Must</u> (Different Service Designs is Counterproductive)**
- **Waste Management Must Be Planned for Ear**
- **<u>Do Not</u> Expect Contractor Support for 12+ Months**

Conclusions

- Sustainability is a New Concept for the Army and DOD
- A Clear Definition is Required
- Education (Soldier & Civilian) is Critical
- Same Priority for Research and Development for Sustainability as Warfighting
- Incorporate into Operational Planning and Execution as Early as Possible
- Designated Leaders in the Army and in the Joint Community with Clear Lines of Responsibility Need to be Identified

Where Do We Want To Be ?

- Survivable, Portable, Deployable, Modular and Scalable Systems with Optimized Resource Requirements that are Reusable, Durable, Reliable, Compatible and Interdependent
- Joint & Combined
- Sustainable for the Long Haul
- “Zero Footprint”
- Designs in the Works for Next Generation

Thinking Beyond the Current Warfight

How Do We Get There ?

- Clear Requirements and Lines of Responsibility
- Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facility Assessments and Solutions
  - New Concept Plans
  - Research & Development
  - Coordinated Working Groups for Implementation Strategies
- Reorganization
  - CONOPS Proponent
  - Base Camp Proponent
  - Improved Acquisition Process
  - Skill Sets
- Joint & Combined
  - Exercises
  - Information Sharing
  - Standardization Across DOD

Questions?

Backup Slides

Reduce Resource Requirements

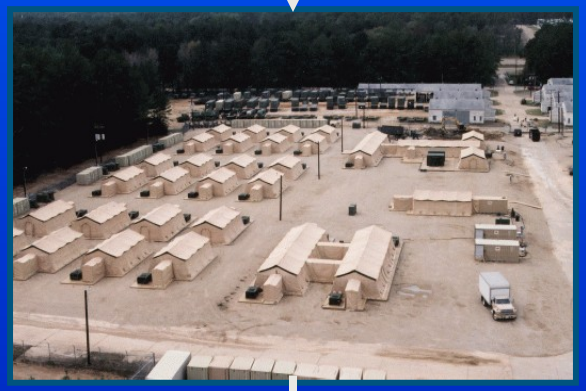
- Initial:
  - Wastewater Dumped
  - Combustible Solid Waste Burned
  - Non-Combustible Solid Waste Stockpiled
  - Hazardous Waste (Non-Medical) Stockpiled

- Intermediate
  - Black Water Collected by Contractor
    Grey Water Dumped
  - Combustible Solid Waste Burned
  - Non-Combustible Solid Waste Collected by Contractor
  - Hazardous Waste (Non-Medical) Stockpiled

- Longer-Term:
  - Black Water Collected by Contractor
    Grey Water Dumped, Sanitation System Established,
    Collected by Contractor
  - Solid Waste Collected by Contractor
  - Hazardous Waste Collected by Contractor

Reduce Resource Requirements

Supplies
- Food
- Water
- Fuel/Power
- Personal Items
- Maintenance Materials
- Construction Materials
- Operations Materials



Waste

- Food Garbage
- Sanitary Water (Grey/Black)
- Wash Rack Water
- Solid Waste (Construction Debris, Packing Waste, Sludge)
- Hazardous Waste (Medical, Maintenance, Operational)

Reduce Resource Requirements

Supplies

Resources

Recyclables

Water

Sludge

Water Processing Plant

Gray Water
Black Water

Soil

Composter

Solid Waste

Ash

Waste To Energy Converter

10%

Energy

Waste Heat

Blended Fuel

"Designer Trash"

Used Oil